CLAIMS

What is claimed is:

1. A method comprising:

depositing a no-flow underfill material in a component mounting area of a substrate, the component mounting area comprising a plurality of pads;

placing a component on the component mounting area, such that terminals of the component are aligned with corresponding pads and substantially enveloped in the underfill material;

applying suitable pressure to cause the terminals to physically contact the pads; and

applying suitable heat to harden the underfill material.

2. The method recited in claim 1, wherein, in depositing, the underfill material is deposited over the pads.

3. The method recited in claim 1, wherein, in depositing, the underfill material comprises a filler material to reduce the coefficient of thermal expansion.

4. The method recited in claim 1, wherein, in depositing, the underfill material comprises a filler material to increase the modulus of elasticity.

5. The method recited in claim 1, wherein, in depositing, the underfill material comprises a filler material to increase the viscosity.

6. The method recited in claim 1, wherein, in depositing, the underfill material comprises a filler material selected from the group comprising silica, silicon oxide, silicon dioxide, silicon nitride, aluminum oxide, and aluminum nitride.

7. The method recited in claim 6, wherein, in depositing, the filler material is in the range of 0% to 80%, by weight, of the underfill material.

8. The method recited in claim 1, wherein, in depositing, the underfill material comprises filler particles having a size in the range of 0.05 microns to 40 microns.

9. The method recited in claim 8, wherein, in depositing, the filler particles are substantially spherical.

10. The method recited in claim 1, wherein, in depositing, the underfill material comprises a resin selected from the group comprising an epoxy resin, a siloxirane resin, a superoxirane resin, a polybenzoxazine resin, a benzocyclobutane resin, or a mixture thereof.

11. The method recited in claim 1, wherein, in depositing, the underfill material comprises a fluxing agent.

12. The method recited in claim 11, wherein, in depositing, the fluxing agent is selected from the group comprising an organic carboxylic acid, a polymeric fluxing agent that has one or more carboxylic acid groups, an organic compound that contains one or more hydroxyl groups, or a mixture thereof.

13. The method recited in claim 1, wherein the pads are pre-coated with solder, and wherein, in applying suitable heat, the terminals become attached to the pads through the solder.

14. The method recited in claim 1, wherein the terminals are pre-coated with solder, and wherein, in applying suitable heat, the terminals become attached to the pads through the solder.

15. The method recited in claim 1, wherein the terminals and the pads are pre-coated with solder, and wherein, in applying suitable heat, the terminals become attached to the pads through the solder.

16. The method recited in claim 1, wherein the operations of applying suitable pressure and suitable heat are performed substantially concurrently.

17. The method recited in claim 16, wherein the operations of applying suitable pressure and suitable heat are performed by apparatus from the group comprising a thermocompression bonder and an ultrasonic bonder.

18. The method recited in claim 1, wherein the operation of applying suitable pressure is performed by a die placement tool.

19. The method recited in claim 18, wherein the pads are pre-coated with solder, and wherein the method further comprises:

pre-attaching the terminals to the pads by applying suitable heat using the die placement tool.

20. The method recited in claim 18, wherein the terminals are pre-coated with solder, and wherein the method further comprises:

pre-attaching the terminals to the pads by applying suitable heat using the die placement tool.

21. The method recited in claim 18, wherein the operation of applying suitable heat is performed by solder reflow apparatus.

22. A component package fabricated by:

depositing a no-flow underfill material in a component mounting area of a substrate, the component mounting area comprising a plurality of pads;

placing a component on the component mounting area, such that terminals of the component are aligned with corresponding pads and substantially enveloped in the underfill material;

applying suitable pressure to cause the terminals to physically contact the pads; and

applying suitable heat to harden the underfill material.

23. The component package recited in claim 22 and fabricated such that the operations of applying suitable pressure and suitable heat are performed substantially concurrently by apparatus from the group comprising a thermocompression bonder, an ultrasonic bonder, and a component placement tool.

24. The component package recited in claim 22 and fabricated such that the pads are pre-coated with solder, and wherein, in applying suitable heat, the terminals become attached to the pads through the solder.

25. The component package recited in claim 22 and fabricated such that the terminals are pre-coated with solder, and wherein, in applying suitable heat, the terminals become attached to the pads through the solder.

26. The component package recited in claim 22, wherein the underfill material comprises a filler material selected from the group comprising silica, silicon oxide, silicon dioxide, silicon nitride, aluminum oxide, and aluminum nitride.

27. An electronic assembly comprising at least one integrated circuit (IC) package fabricated by:

depositing a no-flow underfill material in an IC mounting area of a substrate, the IC mounting area comprising a plurality of pads;

placing an IC on the IC mounting area, such that terminals of the IC are aligned with corresponding pads and substantially enveloped in the underfill material;

applying suitable pressure to cause the terminals to physically contact the pads; and

applying suitable heat to harden the underfill material.

28. The electronic assembly recited in claim 27 and fabricated such that the operations of applying suitable pressure and suitable heat are performed substantially concurrently by apparatus from the group comprising a thermocompression bonder, an ultrasonic bonder, and a component placement tool.

29. The electronic assembly recited in claim 27, wherein the underfill material comprises a filler material selected from the group comprising silica, silicon oxide, silicon dioxide, silicon nitride, aluminum oxide, and aluminum nitride.

30. An electronic system comprising:

a bus coupling components in the electronic system;

a display coupled to the bus;

external memory coupled to the bus; and

a processor coupled to the bus and having an electronic assembly including at least one integrated circuit (IC) package fabricated by:

depositing a no-flow underfill material in an integrated circuit (IC) mounting area of a substrate, the IC mounting area comprising a plurality of pads;

placing an IC on the IC mounting area, such that terminals of the IC are aligned with corresponding pads and substantially enveloped in the underfill material;

applying suitable pressure to cause the terminals to physically contact the pads; and

applying suitable heat to harden the underfill material.

31. The electronic system recited in claim 30 and fabricated such that the operations of applying suitable pressure and suitable heat are performed substantially concurrently by apparatus from the group comprising a thermocompression bonder, an ultrasonic bonder, and a component placement tool.

32. The electronic system recited in claim 30, wherein the underfill material comprises a filler material selected from the group comprising silica, silicon oxide, silicon dioxide, silicon nitride, aluminum oxide, and aluminum nitride.